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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/567,646

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Atsushi Seki

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EXAMINER

BOLDA, ERIC L

ART UNIT

PAPER NUMBER

3663

NOTIFICATION DATE

DELIVERY MODE

09/03/2008

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

gbpatent@gbpatent.com  
pto@gbpatent.com

<b>Office Action Summary</b>	<b>Application No.</b> 10/567,646	<b>Applicant(s)</b> SEKI, ATSUSHI	
	<b>Examiner</b> ERIC BOLDA	<b>Art Unit</b> 3663	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 27 May 2008.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1,2,4-13 and 15-24 is/are pending in the application.
- 4a) Of the above claim(s) 10,11 and 21 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2,4-9,12,13,15-20 and 22-24 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Response to Amendment***

1. This Office Action is responsive to Applicant's amendment of May 27, 2008. Claims 1-2, 3-13, 15-24 are pending. Claims 10-11, and 21 are withdrawn. Because claim 22 was not rejected or allowed in the previous Office action, the this Action is non-final. Any inconvenience to Applicant is regretted.

### ***Response to Arguments***

2. Applicant has not specifically traversed or addressed the 35 USC 112 (2<sup>nd</sup> para.) rejection of claims 4, 5, 15 and 16. These claims have been amended, which the Examiner assumes is in response to this rejection. The 35 USC 112 (2<sup>nd</sup> para.) rejection is withdrawn with regard to claims 4, 5, and 15. However, although claims 4 and 5 are now clear, claims 16 contains the phrase "when said optical switch connects the outgoing side of said first back-end optical fiber amplifier and the incident side of said second front-end optical fiber amplifier to each other". When considering the incident side of the second front-end optical fiber amplifier, it is unclear whether light incident from the pump or signal light incident from the previous amplifiers is meant. Therefore, the 35 USC 112 (2<sup>nd</sup> para.) rejection is maintained with regard to claim 16.

3. Applicant's argument regarding the 35 USC 103(a) rejection of claims 1-9 and 12-20, and as applied to the new claims 23-24 have been considered. Because Applicant argues (p. 14 last paragraph) that the two-stage amplifier of DiGiovanni does not amplify the L-band of light, as would be required in replacing the single stage L-band amplifier (220) of Shiota, a new reference has been cited that teaches this feature.

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Applicant's further argue (p. 13 3<sup>rd</sup> para., p. 14, 1<sup>st</sup> -2<sup>nd</sup> para.) that if the single stage fiber (21) and (22) of Shiota were replaced with fiber (18) and (19) of DiGiovanni in the manner suggested in the previous Office Action, one would not arrive at the combination of features recited in claim 1. In response, the Examiner respectfully believe Applicant has misunderstood the rejection. The references were to be combined by placing the optical switch (50) of Shiota *between the coupler (28) and second stage fiber amplifier (19)* of DiGiovanni; thus the pump light source (34) in DiGiovanni would introduce light in (back-end) fiber (19), while the pump (38) introduces pump light into (front end) fiber amplifier (18). This does not contradict claim 1, because the *direction* of the pump light propagation in the front-end amplifier is not claimed. Nowhere does the claim recite that *a pump is situated between the two optical fibers* (front-end and back end amplifiers), nor can this be inferred from the claim.

4. In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning (p. 15, 2<sup>nd</sup> para.), it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

5. Further explanation of the rejection incorporating the newly found reference is found below.

***Claim Rejections - 35 USC § 103***

6. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

7. Claims 1,2, 4-9, 12-13, 15-20, and 22-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shiota et al. (US 6,535,331) in view of DiGiovanni et al. (5,115,338) and further in view of Liu (US 6,381,063). Note that the citations made herein are done so for the convenience of the applicant; they are in no way intended to be limiting. The prior art should be considered in its entirety.

With regard to claims 1, 12 and 22, Shiota discloses in Fig. 2 a wideband optical amplifier comprising

- a first optical fiber amplifier (21) that amplifies incident light,
- a first front end pumping light source (31) that generates pumping light supplied to the first fiber amplifier
- a first WDM coupler (31c) acting as means to introduce pumping light to the first optical fiber amplifier
- a second optical fiber amplifier (22)
- a second pumping light source (32) that generates pumping light supplied to the second optical fiber amplifier
- a second WDM coupler (32c) acting as means to introduce pumping light to the second optical fiber amplifier
- an optical connecting means (optical switch (50)) that connects an outgoing side of the first fiber amplifier (1) and output terminal (2), in the

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case of C-band operation, *or* connects the outgoing side (1) of the first fiber amplifier (21) and the incident side (4) of the second optical fiber amplifier (22), thereby causing the second optical fiber amplifier to amplify outgoing light of said first optical fiber, resulting in L-band operation.

Shiota does not disclose second stage fibers, i. e. that the first fiber amplifier is actually consisting of a front-end and back end fiber amplifier, and that the second fiber amplifier is actually consisting of a front-end and back end fiber amplifier. However, Digiovanni teaches in Fig. 1 an optical fiber amplifier that operates in the C-band (1<sup>st</sup> col. lines 59-60) with two gain stages (18) and (19), which can be designate as the front end (receives input signal) and back end (outputs final amplified signal). Liu teaches in Fig. 15b an optical fiber amplifier that operates in the L-band (title) with two gain stages (10a) and (10b). Note that the first amplifier (21) of Shiota operates in the C-band, while the second amplifier (22) operates in the L-band. Replacing the single stage C-band fiber amplifier (21) with the two stage amplifier of Digiovanni, in such a way that the optical switch (50) of Shiota is between the amplifier (19) and the coupler (28) of DiGiovanni, and replacing the single stage L-band amplifier with the two stage amplifier of Liu results in the claimed invention. Note that while it is an objective of Shiota to create an amplifier with relatively few components, the improvement afforded by using the two stage amplifiers of DiGiovanni and Liu would also be a consideration to one skilled in the art and therefore the combination suggested above would be obvious to try. Liu states that the L-band two stage amplifier has reduced noise and high pumping

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efficiency (3<sup>rd</sup> col. lines 27-36). DiGiovanni states that the C-band two stage amplifier achieves higher gain with more efficient use of pump light (4<sup>th</sup> para. lines 52-60).

With regard to claims 2 and 13, the two stages of each amplifier as taught by DiGiovanni comprise an isolator (16) that blocks light from the second (back-end) (19) to the first (front-end) stage (18).

With regard to claims 4, 5, 15, and 16, it is inherent that the combined gain signal of the first front end and second front end amplifiers is large enough that noise from the second stage of the first amplifier can be neglected (DiGiovanni 4<sup>th</sup> col. lines 31-38).

With regard to claims 6, 7, 17, 18, 23, and 24 the clauses "a wavelength band of the outgoing light of said first back-end optical fiber amplifier is the C-band" "a wavelength band of the outgoing light of said second back-end fiber amplifier is the L-band" etc. are essentially statements of intended or desired use, or of material worked upon by the apparatus. Thus, these claims as well as other statements of intended use do not serve to patentably distinguish the claimed structure over that of the reference. See MPEP § 2114 and 2115. In this case, when only the first optical amplifier (21) is switched in (from (1) to (2)), the wavelength band of the outgoing light is C-band. When the second optical amplifier (22) is switched in (from (1) to (4) and (3) to (2)) the band of the output light is L-band.

With regard to claims 8 and 19, all the optical amplifiers are erbium-doped optical fiber.

With regard to claims 9 and 20, the pumping light source generates 980 nm wavelength light (DiGiovanni, 3<sup>rd</sup> col. lines 63-68).

***Conclusion***

8. Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Eric Bolda whose telephone number is 571-272-8104. The examiner can normally be reached on M-F from 8:30am to 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the Examiner's supervisor, Jack Keith, can be reached on 571-272-6878. Please note the fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Eric Bolda/

Primary Examiner, Art Unit 3663